

CLAIMS

1. A particulate clay material which is surface-modified with at least one organic compound comprising an organic portion and a basic portion.
2. A particulate clay material according to claim 1, wherein the organic portion of the organic compound comprises a straight or branched chain alkyl group having between 8 and 24 carbon atoms.
3. A particulate clay material according to claim 1, wherein the organic portion of the organic compound comprises one or more cyclic organic groups, which may be saturated, unsaturated or aromatic, and may optionally include one or more heteroatoms.
4. A particulate clay material according to any one of the preceding claims, wherein the organic portion of the organic compound includes one or more functional substituent groups which can favourably interact with a polymer filled using the material.
5. A particulate clay material according to any one of the preceding claims, wherein the basic portion of the organic compound comprises one or more primary amine group NH_2 .
6. A particulate clay material according to claim 1, wherein the organic compound is selected from hydrogenated-tallowalkyl-amine, organic mono-amines, organic polyamines, melamine, and derivatives thereof in which the organic portion carries at least one functional substituent group which can favourably interact with a polymer filled using the material.
7. A particulate clay material according to any one of the preceding claims, in the form of substantially dry particles.
8. A particulate clay material according to any one of the preceding claims, having a mean equivalent particle diameter less than or equal to about 4 microns (μm), and a particle shape factor which is greater than about 10.

9. A particulate clay material according to any one of the preceding claims, wherein the clay is selected from hydrous kaolin, partially calcined kaolin (metakaolin), fully calcined kaolin, ball clay, talc, mica and any combination thereof.
10. A method of preparing a particulate clay material according to any one of the preceding claims, comprising contacting a particulate clay which is not surface-modified with the organic compound or compounds with a sufficient quantity of the organic compound or compounds under conditions whereby the said organic compound or compounds associate with the particles of the particulate clay to surface-modify the same.
11. A polymer composition comprising a polymer and a particulate clay filler distributed in the polymer composition, wherein the particulate clay filler is a material according to any one of claims 1 to 9.
12. A polymer composition according to claim 11, wherein the polymer is a thermoplastic polymer.
13. A polymer composition according to claim 11 or claim 12, which is a flame retardant polymer composition.
14. A polymer composition according to any one of claims 11 to 13, wherein the particulate clay filler is present in the polymer composition at a particle number per unit volume of at least about 1 particle per $100 \mu\text{m}^3$.
15. A polymer composition according to any one of claims 11 to 14, wherein the clay filler is present in the polymer composition between about 5 and about 200 parts by weight per hundred of polymer.
16. A polymer composition according to claim 15, wherein the clay filler is present in the polymer composition between about 5 and about 100 parts by weight per hundred of polymer.
17. A polymer composition according to claim 16, wherein the clay filler is present between about 10 and about 50 parts by weight per hundred of polymer.

18. A polymer composition according to claim 17, wherein the clay filler is present in the range of 20 to 40 parts by weight per hundred of polymer.

19. A polymer composition according to any one of claims 11 to 18, comprising one or more further components selected from one or more conventional flame retardant component, one or more conventional non-flame retardant component, and both.

20. A polymer composition according to claim 19, wherein the conventional flame retardant component is selected from phosphorus-containing compounds, boron-containing compounds, metal salts, metal hydroxides, metal oxides, hydrates thereof, organoclays, halogenated hydrocarbons, and any combination thereof.

21. A polymer composition according to claim 19, wherein the conventional flame retardant component comprises ATH.

22. A polymer composition according to any one of claims 19 to 21, wherein the conventional non-flame retardant component is selected from pigments, colorants, anti-degradants, anti-oxidants, impact modifiers, inert fillers, slip agents, antistatic agents, mineral oils, stabilisers, flow enhancers, mould release agents, nucleating agents, clarifying agents and any combination thereof.

23. A particulate filler material for a flame retardant polymer composition, the filler material comprising a mixture of a particulate clay and one or more further particulate flame retardant, wherein the particulate clay is a material according to any one of claims 1 to 9.

24. A particulate filler material according to claim 23, wherein the one or more further particulate flame retardant comprises ATH.

25. A process for forming a polymer composition as defined in any one of claims 11 to 22, comprising mixing a liquid or particulate solid polymer or one or more precursor thereof with a material according to any one of claims 1 to 9 and any other desired components, and - if one or more precursor of the polymer component is present - subsequently curing the mixture.

26. A mixture of a liquid or particulate solid polymer or one or more precursor thereof and a particulate clay material according to any one of claims 1 to 9 and optionally any other components of a polymer composition as desired, for subsequent processing to form a polymer composition according to any one of claims 11 to 22.

27. An article formed from a flame retardant polymer composition according to any one of claims 11 to 22.

28. A sheath, coating or housing for an electrical product, formed from a polymer composition as claimed in any one of claims 11 to 22.